

Patent Claims

1. Oil separator (1) for the separation of oil from the crankcase ventilation gas of a combustion engine, comprising a housing (10) and a separation element (20) arranged therein, an inlet (11) for gas to be cleaned, an outlet (12) for cleaned gas, and an outlet (13) for separated oil,

characterized in that

- an uncleaned-gas region (11') of the housing (10), that is arranged adjacent to the inlet (11), is designed with an oil sink (14) where coarse-particle oil that is carried along with the inflowing gas flow deposits,

- the oil separator (1) comprises not only the separation element (20) but also a coarse-particle-oil cyclone (30) the inflow opening of which is positioned in the oil sink (14) at the same level as the latter, and

- the separation element (20) comprises an inflow opening (21) that is spatially positioned at a level above the inflow opening (31) of the coarse-particle-oil cyclone (30).

2. Oil separator according to claim 1, characterized in that the coarse-particle-oil cyclone (30) and the separation element (20) are designed such that a first partial flow of the crankcase ventilation gas flowing through the coarse-particle-oil cyclone (30) is smaller than the remaining second partial flow of the crankcase ventilation gas flowing through the separation element (20).

3. Oil separator according to claim 1 or 2, characterized in that the uncleaned-gas region (11') of the housing (10), that is arranged adjacent to the inlet (11), is equipped with means to decelerate and/or redirect the flow of the gas to be cleaned.

4. Oil separator according to one of the preceding claims, characterized in that the coarse-particle-oil cyclone (30) comprises a gas outflow opening (32) that is formed by an inner pipe (32') projecting into the coarse-particle-oil cyclone (30) from above, said inner pipe (32') being connected to the outlet (12) for cleaned gas.

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5. Oil separator according to anyone of claims 1 through 3, characterized in that the coarse-particle-oil cyclone (30) is closed at its top and that the oil outflow opening (33) at the bottom side of the coarse-particle-oil cyclone (30) also forms the latter's gas outflow opening (32), wherein this outflow opening (32, 33) is connected both to the outlet (13) for separated oil and to the outlet (12) for cleaned gas.

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6. Oil separator according to claim 5, characterized in that the connection between the combined oil and gas outflow opening (32, 33) on the one hand and the outlet (12) for cleaned gas on the other hand are formed by an internal oil return line (15) that connects an outlet-side cleaned-gas region (12') of

the housing (10) to the latter's oil outlet region (13').

5 7. Oil separator according to one of the preceding claims, characterized in that the separation element (20) is formed by one or more cyclones.

10 8. Oil separator according to one of the preceding claims, characterized in that the separation element (20) is formed by one or more coalescers.

15 9. Oil separator according to one of the preceding claims, characterized in that the separation element (20), together with the coarse-particle-oil cyclone (30), is formed as an insert (2) that can be inserted in and can be removed from the housing (10).

20 10. Oil separator according to one of the preceding claims, characterized in that a pressure limiting valve (4) is integrated in the housing (10) between the latter's uncleaned-gas region (11') and cleaned-gas region (12').

25 11. Oil separator according to Claims 9 and 10, characterized in that the pressure limiting valve (4) is designed as a part of the insert (2).

30 12. Oil separator according to one of the preceding claims, characterized in that a vacuum pressure regulating valve (5) is integrated in the cleaned-gas region (12') of the housing (10).
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